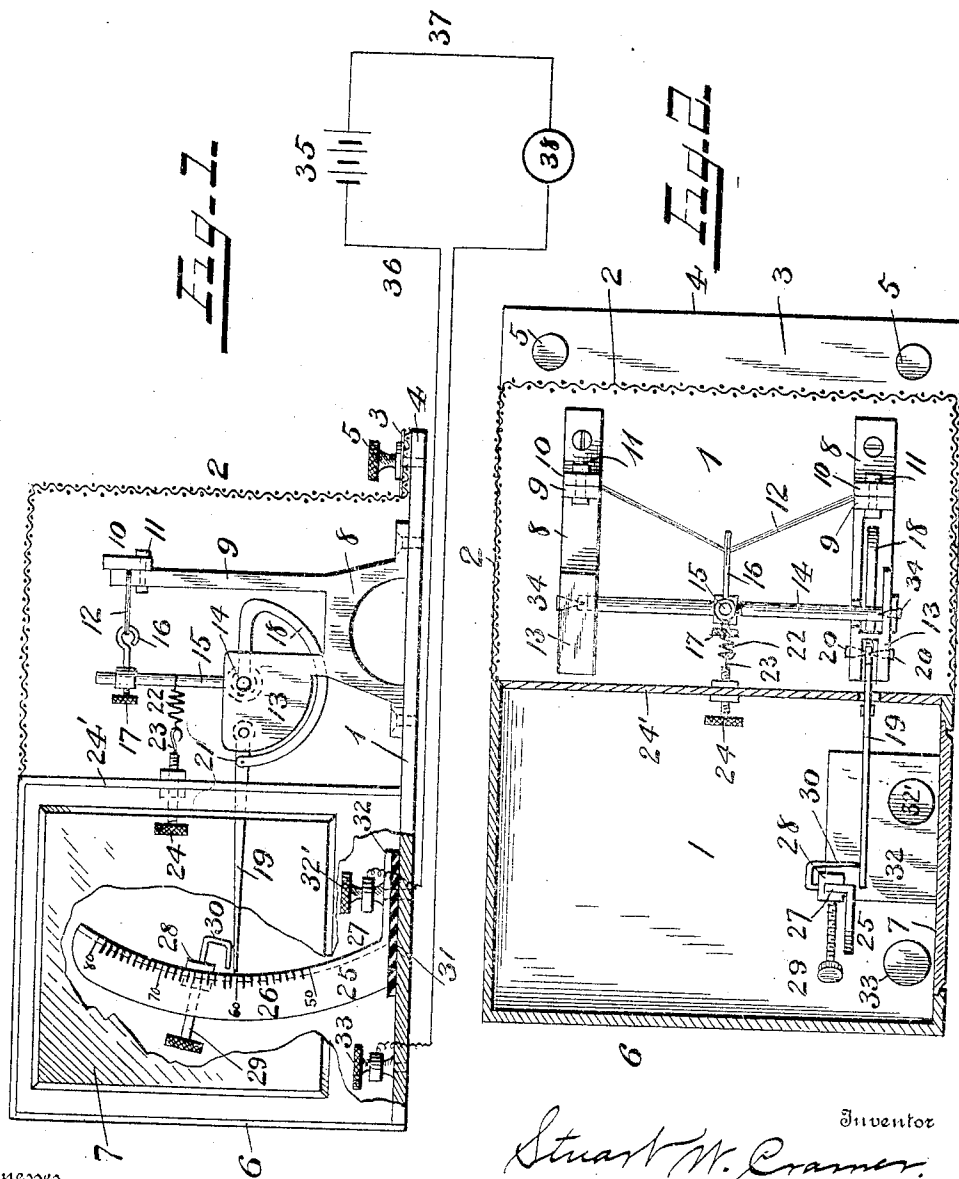


S. W. CRAMER.
AUTOMATIC INDICATING AND REGULATING HYGROMETER.

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UNITED STATES PATENT OFFICE.

STUART W. CRAMER, OF CHARLOTTE, NORTH CAROLINA.

AUTOMATIC INDICATING AND REGULATING HYGROMETER.

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To all whom it may concern:

Be it known that I, STUART W. CRAMER, a citizen of the United States, residing at Charlotte, in the county of Mecklenburg and State of North Carolina, have invented certain new and useful Improvements in Automatic Indicating and Regulating Hygrometers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to instruments for measuring and recording the degree of moisture in the atmosphere and for automatically controlling the same to maintain a predetermined degree of humidity in a factory or other building and in separate compartments or rooms thereof.

The invention consists of an electrically controlled and indicating hygrometer based upon the principle well known in physics of the effect of moisture upon bundles of hair or other like filaments, the sensitiveness of which depends upon the presence of a greater or less amount of moisture in the atmosphere, and will be fully disclosed in the following specification and claim.

In the accompanying drawings, which form part of this specification, Figure 1 represents a front elevation of my improved hygrometer, and Fig. 2 a top plan view of the same.

Reference being had to the drawings and the designating characters thereon, 1 indicates the metallic base of the instrument; 2, a woven-wire inclosure or guard to protect the mechanism at one end of the instrument and yet allow free access of the atmosphere thereto to act thereon; 3, a clamping-plate engaging the wire and by which it is secured to the ledge 4 of the base 1 by thumb-screws 5.

6 indicates a sheet-metal case inclosing the registering part of the instrument and is provided with a glass panel 7, through which the registering or indicating scale is seen.

8 8 indicate metallic stands or frames secured to the base 1 and having vertical arms 9, on which are clamping-plates 10, secured by bolts 11, and which plates engage and support a bundle of hairs or other suitable filaments 12 at their ends. On the stands 8 are brackets 13, in which a shaft 14 is supported and to which shaft a vertical arm 15 is rigidly secured and supports a hook 16, which is adjustably secured to the arm by a thumb-

screw 17 to permit the hook to slide up or down on the arm, as may be required.

18 indicates a counterbalanced semicircular crank-arm which is secured to the shaft 14 to rock therewith and transmit the motion of the arm 15 to the needle 19, pivotally supported on needle-point bearings 20 in one of the stands 8, and the needle is also pivotally connected to the outer end of the crank-arm 18 at 21, sufficient play being allowed to prevent binding on the pivot.

22 indicates a helically-coiled spring connected at one end to the arm 15 and engaging a hook 23 at its opposite end, which is attached to an adjusting-screw 24, secured to the partition 24' for applying tension to the spring, the arm 15, and the bundle of filaments 12 to adjust the mechanism.

25 indicates an arc-shaped bar having a graduated scale 26 thereon, the graduation being in units corresponding to degrees of relative humidity, and on the bar is a right-angled rib 27, on which is a clamp 28, provided with a screw 29 for securing the clamp to the rib, and attached to said clamp is a thin metal strip or tongue 30 for the purpose of making electrical contact with the needle 19 to make and break an electrical circuit.

31 is an insulating-washer between the foot 32 of the bar 25 and the base 1.

32' is a binding-post secured to the foot 32 for electrical connection and forming part of the graduated bar 25. 33 is another binding-post secured to the metallic base 1. This binding-post is electrically connected to the needle 19, which is grounded to the mechanism which is directly secured to the base 1.

The shaft 14 is supported in suitable bearings at 34, and the bearings 20 of the needle 19 are of like character to reduce friction to the minimum.

35 indicates a source of electrical energy, conventionally shown as a battery, but may be a dynamo, and from the battery extend wires 36 and 37, connecting, respectively, with the binding-posts 32' and 33 and with an electromagnet (indicated by 38) for operating a valve (not shown) for regulating the supply of water to a system of humidifying devices.

The operation is as follows: Changes in the humidity of the atmosphere affecting the sensitive member (preferably a bundle of hairs) cause it to alternately contract or expand, which action is communicated to the

shaft 14 and through the intermediate mechanism to the needle 19 in magnified extent, causing it to travel up or down the graduated bar 25, as the case may be, and make or
5 break contact with the strip or tongue 30, and thereby make and break the electrical circuit which operates upon the electromagnet 38 to regulate the supply of water to increase or reduce the degree of humidity of
10 the atmosphere.

Having thus fully described my invention, what I claim is—

A hygrometer provided with an expansible and contractible member, a shaft, an arm on
15 the shaft connected to said member, a crank-

arm secured to said shaft, a needle pivotally supported and connected to the crank-arm beyond its pivotal support, a tongue for making contact therewith, and a graduated scale; in combination with an electromagnet for operating a valve, a source of electrical energy, and electrical connections between the needle of the hygrometer, the magnet, and said source of electrical energy.

In testimony whereof I affix my signature 25 in presence of two witnesses.

STUART W. CRAMER.

Witnesses:

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